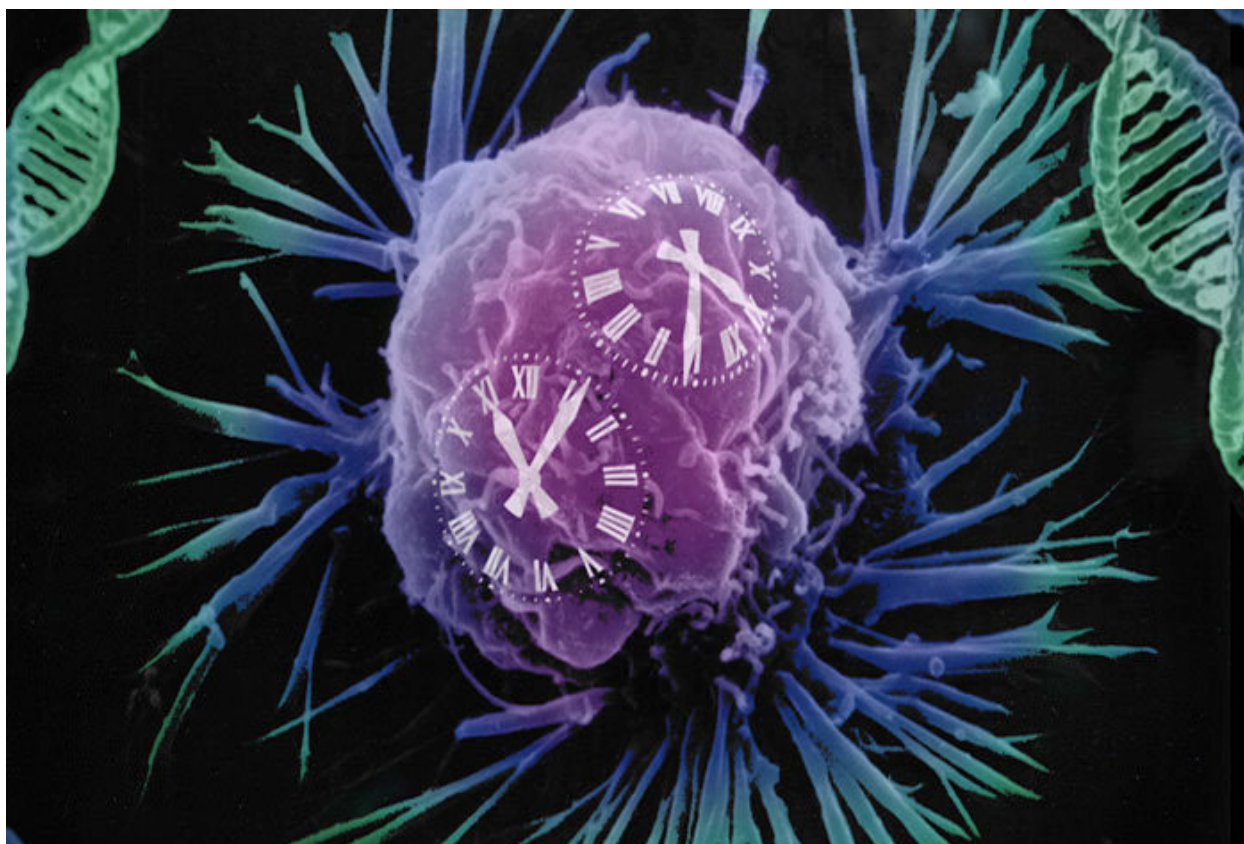


Molecular clocks control mutation rate in human cells

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In research reported in the journal *Nature Genetics*, two clock-like mutational processes have been found in human cells, and the rates at which the two clocks tick in different human cell types have been determined.

“This is a hugely exciting finding as it solves a longstanding question,” said Ludmil Alexandrov, Oppenheimer Fellow at Los Alamos National Laboratory. “Not only has this study proved that mutational molecular clocks exist, it has also shown that there are two separate clock processes that are constantly degrading DNA. How fast these clocks tick in a cell may well determine both the ageing of this cell and the likelihood for it to become cancerous.”

The genomes of cancer cells held the key to finding the molecular clocks. Previous work on cancer had revealed that mutations often leave a molecular fingerprint, called a mutational signature, on the genome of a cancer cell. To identify the mutational

signatures of clock-like mutational processes in the human body, the study looked at the DNA sequences of 10,250 cancer genomes from 36 different types of cancer.

“This study is important and could have practical implications for cancer patients,” said Julian Sale of England’s Medical Research Council Laboratory of Molecular Biology. “In the future it could lead to clinicians being able to compare the genomes of a primary tumor and any metastases and determine the length of time it had taken to spread.”

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